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## ABSTRACT

The paper describes Project TEACH (Technical Educational Aids for Children with Handicaps), a program at the Shrine School which is designed to meet the needs of physically handicapped and health impaired children. The program emphasizes the use of specialized equipment with the severely physically handicapped children at the school. The need for adequate physical management is stressed as is the importance of such aspects as proper seating and the use of powered equipment which is considered invaluable when it increases mobility. The communication needs of this population are discussed. The educational program is outlined, including the academic, vocational, and developmental aspects. It is explained that the project has five children in each of the three educational program areas who each receive individualized programs using equipment tailored to their special needs. (PHR)

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STRATEGIES FOR THE IMPLEMENTATION  
OF TECHNICAL AIDS WITH  
PHYSICALLY HANDICAPPED CHILDREN

as presented  
to the

COUNCIL FOR EXCEPTIONAL CHILDREN  
58th INTERNATIONAL CONVENTION  
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## Project TEACH

### An Overview

As a result of the Education for All Handicapped Children Act of 1975, educators have been faced with the challenge of serving a population that includes more severely physically handicapped children than ever before. Severely physically handicapped children have needs that are multifold and complex. Many of these children have difficulties associated with Activities of Daily Living (ADL) such as sitting, feeding, mobility and toileting. In addition functional communication is often lacking. In order to provide an appropriate education for these children, many of the obstacles presented by these needs must first be overcome.

The Shrine School, which is part of the Memphis City Schools Division of Special Education, is a school whose programs are designed to meet the needs of physically handicapped and health impaired children. The philosophy of the educational staff is to meet these needs through an interdisciplinary team approach. In addition to the teaching staff, we have the services of physical therapy, occupational therapy, speech pathology and various specialized resource teachers. Coordination with community agencies has resulted in optometric, dental, nursing and rehabilitation engineering services. Representatives of each discipline participate in serving the specific needs of each child as determined by the interdisciplinary team.

It is the purpose of this presentation to provide an overview of our educational and physical management program with an emphasis on the use of specialized equipment with those

severely physically handicapped children who are dependent in Activities of Daily Living and functionally unintelligible as a result of their physical handicap.

The education of the severely physically handicapped child is directly dependent on the type of physical management the child requires. For example: the importance of dynamic, therapeutic seating cannot be overemphasized. Children with limited postural control who have difficulty maintaining a stable sitting posture, spend more time trying not to fall out of their chairs than attending to academic or pre-academic tasks. As well, as soon as they attempt to use their hands or other body parts, their total body postural stability is lost. It is felt that proper seating should ideally be provided before a child is asked to participate in classroom activities.

Proper seating should be provided under the direction of the occupational and/or physical therapist. When this is done several therapeutic concepts are considered. The child must sit on a firm seat with his pelvis blocked into the midline. He should sit as upright as possible to diminish the influence of abnormal postural reflexes. The child's back should also be supported in the midline to help prevent orthopedic deformities such as scoliosis. His head control will determine the amount of support necessary. It is preferable that support be given just below the skull line. This helps reduce abnormal extensor tone or backward thrust. The feet and legs should be well supported and slightly apart. A tray should be considered part of the seating system for the physically handicapped. It has the multiple

purpose of being a communication board, a surface for feeding and other hand skills, and possibly even a part of the support system of the chair.

The specialized seat should be in whatever wheeled base is most appropriate. Often, if the children can push themselves, the chosen base is a wheelchair. Some children are ready for electric wheelchairs and others, who will never be able to push themselves are in a variety of stroller bases.

The traditional view of powered mobility is that children do not need it and it should not be considered until adulthood. It is time for this position to be re-evaluated.

Children learn through movement. Children with severe physical handicaps have very little opportunity for independent movement. As a result the development of perceptual skills and body image are in jeopardy. By allowing independent movement through an electrical device, we allow the child to experience movement in space which helps develop these skills.

A factor to consider is cost, which is not that prohibitive if relative cost is considered. For example, a \$2,000.00 electric wheelchair will last about four to five years. A child wearing long leg braces and using crutches will require about \$4,000.00 worth of equipment and this does not include the cost of therapy or surgery.

Whenever feasible these children are mainstreamed. Providing a powered mobility device can often allow a totally dependent child to get to class on his own. Powered mobility can also assist the partially ambulatory child in getting to and from the classroom without becoming exhausted.

In the broad area of ADL we look in particular to feeding and toileting skills. If a child can feed himself, then there is more probability that he can attend a school program where there are fewer teacher aides. Modifications can be made to spoons so that they are easier to hold. Plates can have built-up edges so food does not fall off. If the child is severely handicapped there are feeding devices where the fine motor skills usually required in feeding are replaced by one or two gross motor skills. In every case, however, the child must be well seated in a firm, stable position before he is asked to perform the complex task of eating.

For severely handicapped children, independent toileting is not always possible. However, modified potty chairs, in which children can be placed in safe positions, allow for a much easier toileting routine, not to mention less strain on the backs of bathroom attendants. The standard toilet seat design is capitalized upon in order that the modified seat can fit on any toilet in any home or school.

No less important are the communication needs of these severely physically handicapped children. As a result of their neurological impairment, many of these children have no means of expression. Because of their limited interaction with people and their environment, their language skills frequently do not develop at a rate comparable to their abilities. The importance of early intervention in the development of language skills and the provision of some means of expression, be it a simple language

board or a sophisticated electronic communication device, cannot be overemphasized as fundamental to any education program.

As a result of these needs, the educational and technical community began to develop a formal mechanism to supply appropriate equipment to these children.

In the fall of 1974 the Rehabilitation Engineering Center in Memphis was established under the Department of Orthopedic Surgery, College of Medicine, University of Tennessee. Its core area of research, as funded in 1975, is seating and mobility for physically handicapped children. The program now has an active service caseload of over 500 children, many of whom attend Memphis City Schools.

In September, 1977, a formal proposal was submitted by Memphis City Schools, Division of Special Education and the Rehabilitation Engineering Center to the Bureau of Education for the Handicapped for a demonstration grant. The premise stated was that technical aids, including therapeutic seating systems, communication aids and devices to promote independence in Activities of Daily Living would help the severely handicapped child to more fully participate in his educational program.

In July of 1978, the Bureau of Education for the Handicapped awarded the Memphis City Schools funding for a three year demonstration project under the Handicapped Children's Early Education Program. The name Project TEACH (Technical Educational Aids for Children with Handicaps) was adopted. Memphis City Schools, through services contracted from the University of Tennessee Rehabilitation Engineering Center, is providing technical aids designed to facilitate communication, proper seating, mobility, feeding, and toileting to ten severely involved cerebral palsied children.

The children selected to participate in Project TEACH exhibit cerebral palsy to the degree that 1) their speech patterns are unintelligible and 2) that they are in need of devices to assist them in activities of daily living such as mobility, feeding and toileting.

The project staff consists of a coordinator- a speech pathologist who is responsible for the implementation and operation of all components of the project, a speech pathologist- who is responsible for communication therapy and programming, an occupational therapist- who is responsible for programming motor control assessment and training programs and who acts as a liason with the Rehabilitation Engineering Center, a research specialist-who designs and administers the evaluation procedures, and a therapy aide- who assists with the therapy and educational programs. All project activities are coordinated with the teaching staff of Shrine School without whose help and input the project could not function.

The educational program at Shrine School is divided into three tracts. The Academic Emphasis Program consists of a pre-primary unit, a non-graded elementary unit and a secondary unit. The curriculum of this program closely follows that of other Memphis City Schools and leads to a high school diploma. The Vocational Emphasis Program is designed to meet the needs of students who require special instructional techniques. The program is divided into four levels. The emphasis shifts from academic to vocational as the students progress through the levels. This program results in the awarding of a Special Education Certificate. The Developmental Emphasis Program is designed to meet the needs of students who are developmentally delayed as well as physically handicapped. The instructional emphasis of this program is on Activities of Daily Living, pre-

communication skills and environmental interaction. There are five Project Teach children in the Academic Emphasis program and five children in the Communication Development class of the Developmental Emphasis program.

Rather than modifying the existing educational program, the goal of Project TEACH has been to provide and coordinate technical services on an individual basis as a supplement to the existing curriculum. In this way the project will attempt to prove that the child will be more able to participate in the special education program that has been prescribed for him. In addition to the twelve teachers in the three educational tracts, the services of speech therapy, occupational therapy, and physical therapy are available. Adaptive physical education, music, art, and a recreational summer program are also available to all Shrine School students.

Experience has indicated that even the most experienced teacher is not always comfortable when first exposed to electronic equipment. It is extremely important that the classroom teacher has a full understanding of the purpose, operation, and maintenance of such equipment before he or she is expected to implement it into the curriculum. As a result, as each technical aid is introduced, Project TEACH staff provides training on an individual basis for each classroom teacher and teacher aide responsible for evaluating the effectiveness of the technical aid in the educational setting. In addition, family members are trained in care and use of any aids as needed.

Project TEACH has five children in the non-graded academic program. One is fully ambulatory and one is ambulatory with a walker. Three are fully dependent on wheelchairs. Of these three, two have been provided with powered mobility. The third

child is in the process of having a custom designed powered mobility system fabricated. All of these children have receptive skills commensurate with their chronological age. For these children the rapid acquisition of encoding skills is of the utmost importance. Prior to the acquisition of any complex communication device, the therapist and teacher work to complement each other's activities in the acquisition of these skills. Experience has indicated that encoding traditional orthography is an extremely difficult skill for the non-verbal child to master. As a result, the speech pathologist would initially prepare simple language boards with a functional sight word vocabulary. The primary objective being to develop appropriate syntax and to train the child to use an alternative communication system projectively. The classroom teacher took the responsibility of developing the important encoding skills. The speech pathologist would also take the responsibility for familiarizing significant others in the child's environment in ways to communicate effectively with an alternative communication system. These include activities such as appropriate ways to ask questions and encouraging spontaneous attempts at communication. As the child's encoding skills become functional, the feasibility of an electronic communication aid can be evaluated. By this time the occupational therapist will have evaluated the child's motor capabilities and arrived at a tentative means of control. Some of our children have progressed through a variety of technical devices on a trial or temporary basis before settling on a permanent aid. In all cases though, motor control is evaluated, independent of the actual communication aid. For some children who are severely motorically involved an aid may need to be custom designed. This

was the case with one of our children. After using a language board accessed with a headstick, two increasingly complex ETRAN systems and the TIC with a custom designed mercury control switch, it was decided that this child could communicate faster than any of the available devices were allowing her to do. An engineer at the UT Rehabilitation Center designed a light sensing device that allowed this child to use a direct selection technique. This aid is now fully independent and portable. This computer based aid will allow this child to be able to operate an electric wheelchair in the near future. The same light sensing device will be used for wheelchair control.

There are five children on Project TEACH who are in the Developmental Emphasis Program. These children are in a specially designed class with an emphasis on communication development. These children are so placed for several reasons: age, delayed cognitive development, and delayed development of language skills as a result of prior experience or environmental factors. This class is language based in curriculum. Many activities are directed toward language enrichment. The teacher, teacher aids, and Speech Pathologist work closely in the development and implementation of an alternative expressive language system. The physical and occupational therapists work with the teacher in developing necessary motor control skills.

Control training for future communication aids is accomplished through the use of a variety of adapted toys. These toys have several types of switches that are interchangeable. Simple battery operated aids developed by the Rehabilitation Engineering Center have been devised to accept interchangeable instructional material that is used for language therapy and teaching of pre-academic skills. A developmental approach is used in teaching

language skills. A Blissymbol system is used. The symbol vocabulary is introduced slowly at first. When some idea is formulated as to the rate at which the child is able to learn the vocabulary, goals are set accordingly.